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The perception of stress and muscles of mastication spasm among dental student

A Project
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بسم الله الرحمن الرحيم

﴿ قالوا سبحانك لا علم لنا الا ما علمتنا

إنك انت العليم الحكيم ﴾

صدق الله العظيم

الآيه(32) سوره البقره

Dedication

I dedicate this project to God Almighty my creator, my strong pillar, my source of inspiration, wisdom, knowledge and understanding. My great teacher and messenger, Mohammed (May Allah bless and grant him), who taught us the purpose of life.

To my dear mother, who supported me all my life and made me the better person I am today, I cannot find enough words to express my gratitude to you.

To my father, who could not be here in these special days (may allah rest his soul in peace).

To My soulmate, who leads me through the valley of darkness

with light of hope and support, you know how much I love you.

To My beloved sisters.

My friends who encourage and support me.

Thank you. My love for you all can never be quantified. God bless you.

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ABSTRACT

Stress is a feeling experienced by everyone, however it is perceived and explained from various aspects in different ways. Stress related parafunctions have a role in initiating and aggravating of temporomandibular disorders. The most common type of painful temporomandibular disorders is myofascial pain.

Objective: To determine the prevalence of stress and examination of the spasm of the muscle of mastication among dental students from collage of Dentistry of university of Baghdad.

Materials and methods: A cross-sectional descriptive study was carried out in February 2018 fifth year dental students from college of Dentistry, university of Baghdad, using a modified form of dental environment stress (DES) questionnaire. A total of 203 questionnaires were distributed and incomplete questionnaires were excluded from the study.

Results: A total of 203 students were asked to complete the questionnaire and 140 (68.9%) responded; of these 37 (26.4%) were males and remaining 103 (73.6) were females. More or less all the students were having stress. In male students severe stress was due to difficulty in getting suitable patient (62.1%) and the distance and time needed to travel the college (59.4%), whereas in female they were having severe stress due to difficulty in getting suitable patient (57.2%), , lack of time to do assigned work (53.3%) and fear of getting infectious diseases like HIV, HBV, etc. (52%).

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Introduction

University students who express stress symptoms are more anxious than the general population, showing higher levels of depression, obsessive compulsive disorders, and interpersonal sensitivity than age-matched students (Newbury-Birch et al., 2002 and Piazza-Waggoner et al., 2003).

Stress develops due to excessive pressure or different types of demands placed on them (Agolla and Ongori, 2009). A number of studies on academic stress among students were previously conducted. Some identified the development of stress because of too many assignments, competition with other students, fear of failure, poor relationship with other students or teachers, family problems, frequent examinations, phobia from examinations, demanding curricula, anxious patients, complicated treatments and possible conflicts with patients and limited time to perform and finish the planned treatment (Fairbrother and Warn, 2003).

Dental schools are known to be highly demanding with a stressful learning environment. Stress can result physical and psychological distress, which leads to affect the performance of the student. It can cause anxiety, depression, phobia, fear, tension dizziness, fatigue, sleeplessness, gastrointestinal disturbance, irritability and cynicism (Al-Saleh et al., 2010).

Haber et al. (1983) have proposed a conceptual model of stress that accounts for the production of muscle and joint symptoms associated with a variety of craniomandibular disorders. In this model, excessive stress results in masticatory muscle hyperactivity that is expressed in various forms of parafunctional activities such as tooth clenching and grinding. These high force activities, according to the Haber model, lead to muscle and joint pain, limited range of motion, and joint sounds. This model is very attractive because it indicates that stress is a common unifying characteristic of all craniomandibular disorders.

Temporomandibular disorders (TMDs) comprise a group of disorders that affect the temporomandibular joint (TMJ), the masticatory muscles or both. TMDs involve musculoskeletal pain, disturbances in the mandibular movement patterns and/or impairment in functional movement (Tjakkes et al, 2010).

Aim of the Study

The purpose of this study was to determine the prevalence of stress and muscle spasm among dental students from college of Dentistry, University of Baghdad.

Chapter one

Review of Literature

1.1 Stress

Stress is defined as the perception of discrepancy between environment demands and individual capacities to fulfill these demands. Stress develops due to excessive pressure or different types of demands placed on them (Agolla and Ongori, 2009). Stress is a feeling experienced by everyone, however it is perceived and explained from various aspects in different ways. There are three kinds of stress definitions (Barrón López de Roda, 1997):

Stress as stimulus: stress is defined as any situation that provokes alteration in the homeostatic processes. This definition has been criticized since it does not consider individual differences in response to the same situation. Individuals are not passive and there are many situations that result in changes of the homeostatic processes but they are not stressful, for instance to breath.

Stress as response: stress is defined in terms of the reactions provoked in the organism. Some authors argue that this kind of definition of stress can be misunderstood since there are both emotional and physical responses that can fit in this definition of stress and they result from non stressful situation, for instance to practice sport.

Stress as interaction: many authors suggest that stress should be understood as a relationship between individuals and their environment. In this specific relationship, the environment is perceived as threatening by individuals who experience that environmental demands exceed their personal resources.

Considering that stress is presented in different dimension of daily life educational experiences can also be perceived as stressful. Academic stress is basically defined as the impact that educational organizations may produce on their students. There are different types of stressful situations identified in different studies on stress in students. The two situations (examination and task overload) are the most stressful ones, these two stressful situations are interrelated since many students considered the examination process stressful because it involves task overload, and other students refer the task overload to an excess of exams (María del Pilar González Vigil, 2005).

1.2 Temporomandibular Joint

The most important functions of the temporomandibular joint (TMJ) are mastication and speech and are of great interest to dentists, orthodontists, clinicians, and radiologists. This interest stems from the standpoints of structure, function, adaptability, symptomatology, pathology, and imaging. The TMJ is a (ginglymoarthrodial joint), a term that is derived from ginglymus, meaning a hinge joint, allowing motion only backward and forward in one plane, and arthrodial, meaning a joint of which permits a gliding motion of the surfaces (Dorland, 1957). The right and left TMJ form a bicondylar articulation and ellipsoid variety of the synovial joints similar to knee articulation (Williams, 1999). The TMJ is formed by the mandibular condyle fitting into the mandibular fossa of the temporal bone, The articular disk and synovial spaces are separating the two bones, The articular portion of the disc is comprised of dense fibrous connective tissue devoid of any nerves and vessels; conversely, the posterior attachment of the disc is richly vascularized and innervated. The disc is attached to the condyle both medially and laterally by collateral ligaments (Wadhwa and Kapila, 2008).

Temporomandibular joint is different from other joints in the body by:

• Both temporomandibular joints are joined by a single bone (mandibular bone) and movement in one joint cannot occur without similar coordinating movement in the other joint (Bramely, 1990).

• The articulating surfaces of the joint are covered by fibrocartilage while other synovial joints in the body covered by hyaline cartilage.

• The joint has two types of movement hinge type and gliding type movements

• The movement of the joint has a rigid end point when the teeth are bringing in maximum intercuspation (Greenberg et al., 2004).

• It is not a true fossa-condyle articulation. The condyle and the disk act as one unit against the articular eminence and not against fossa (Schames J and Schames M, 1997).

1.2.1 Anatomy of Temporomandibular joint

1.2.1.1 The primary components of the TMJ are:

• The mandibular condyle.

• The articular surfaces of the temporal bone (figure 1-2).

• The articular disk (figure 1-2).

• The joint capsule.

The superior portion of the lateral pterygoid muscle is considered as a part of the joint by some authors because the disk is regarded as a direct extension of it (Springer and Greenberg, 1994).

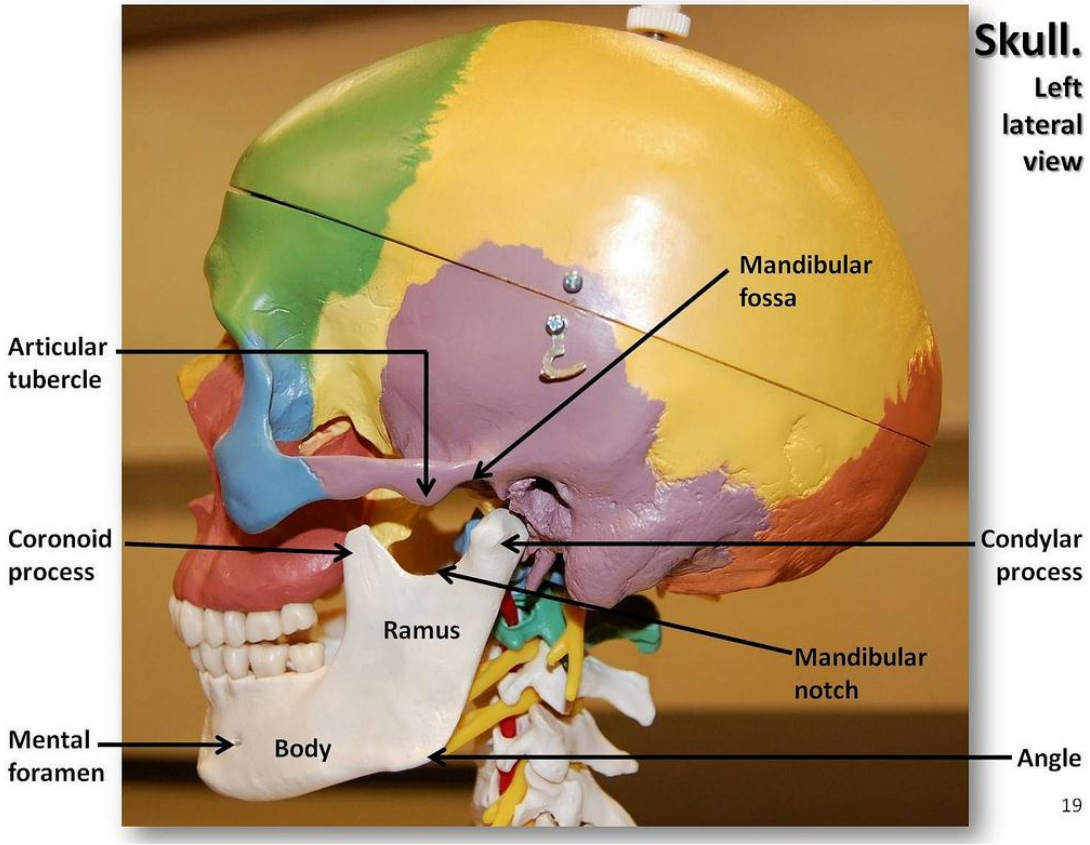


Figure (1-1) Bony components of TMJ. (www.burtchiropractic.com)

1- The condyle

An elliptical projection forms the lower part of the bony joint (Greenberg et al., 2004). It emerges from the posterior margin of the mandibular ramus forms the neck and head of the mandible, with its long axis oriented mediolaterally (Thurman and Michael, 1994).

2- The articular surfaces of the temporal bone

The articular surface of the temporal bone is composed of the concave articular fossa and the convex articular eminence (Thurman and Michael, 1994). The fossa and eminence form S-shaped that develops at about 6 years of age and continues into the second decade (Wright and Moffett, 1974).

The mandibular condyle occupies the space of the fossa, with enough room to both rotate and translate during mandibular movements (Greenberg et al., 2004).

3- The articular disk

It is a collagenous fibrous tissue of variable thickness that occupies the space between the condyle and mandibular fossa. The disk contains variable numbers of cartilage cells and is referred to as a fibrocartilage (Greenberg et al., 2004). Fibrocartilage is better able to withstand sheer forces than hyaline cartilage can, which makes it a superior material for enduring the large amount of occlusal load that is placed on the TMJ (Milam, 2005). On the other hand, fibrocartilage may be targeted differently from hyaline cartilage by factors such as sex hormones that predispose to degenerative changes (Wadhwa and Kapila, 2008). The disk is attached to the lateral and medial poles of the condyle by ligaments consisting of collagen and elastic fibers. These ligaments permit rotational movement of the disk on the condyle during the opening and closing of the jaw (Griffen et al, 1975).

The disk is thin at the center forming the intermediate zone that separates the thicker portions which are called the anterior band and posterior band (Bramely, 1990). Posteriorly, the disk is contiguous with the posterior attachment tissues called the bilaminar zone. The bilaminar zone is a vascular, innervated tissue that plays an important role in allowing the condyle to move forward and provide a volumetric compensatory mechanism for pressure equilibration (Thurman and Michael, 1994). The bilaminar zone is made up of two layers, a lower dense layer and an upper elastic layer. The lower dense layer envelopes the posterior surface of the head of the condyle and inserted into the neck. While the upper lamina runs from the posterior band to become continuous with the fibrous tissue in the squamo-tympanic fissure. When the two laminae diverge, there is a loose connective tissue that containing numerous blood vessels and nerve endings (Scapino, 1991).

Anteriorly muscle attachments inserting into the disk, fibers of the posterior one-third of the temporalis muscle and deep masseter muscle may attach on the anterolateral aspect and fibers of the superior head of the lateral pterygoid insert into the anteromedial two-thirds of the disk. The disk blends with the fibrous capsule at its margins (Velasco et al, 1993).

The disk and its attachments divide the joint into superior and inferior spaces.
The superior joint space is bounded above by the articular fossa and the articular eminence. The inferior joint space is bounded below by the condyle (Thurman and Michael, 1994).

4- The joint capsule

It is a fibrous tissue investment of the joint, attaches to the margins of the articular area on the temporal bone and around the neck of the condyle. The capsule is lined by synovium. The disk fused with fibrous capsule around its periphery, and through this, is more tightly to the mandible than to the temporal bone (Heyling, 1995).

5- The Synovium

Synovial tissue covers all intra-articular surfaces except for the pressure bearing fibrocartilage (disc, condyle, eminence). The synovial tissue is highly innervated and vascularized and has regulatory, phagocytic, and secretory functions. The synovial fluid has metabolic and nutritional functions and it is essential to joint surface lubrication (Howerton and Zysset, 1989).

1.2.2.2 Ligaments of Temporomandibular joint, figure (1-2).

It consists of:

1. The capsular ligament is surrounding the joint and offering support. The fibers are mainly oriented vertically and do not restrain joint movements (Greenberg et al., 2004).
2. The lateral temporomandibular ligament is the main ligament of the joint, lateral to the capsule and its fiber run obliquely from the tubercle on the root of the zygoma to the lateral surface of the neck of the mandible. This ligament limits the movement of the mandible in a posterior direction (Snell, 2000).
3. The sphenomandibular ligament which lies on the medial side of the joint.

These ligaments connect the mandible to the skull, but add little to the strength of the joint, and have no functional significance to the biomechanics of the joint, which is maintained principally by the muscle of mastication (Romanes, 1986).

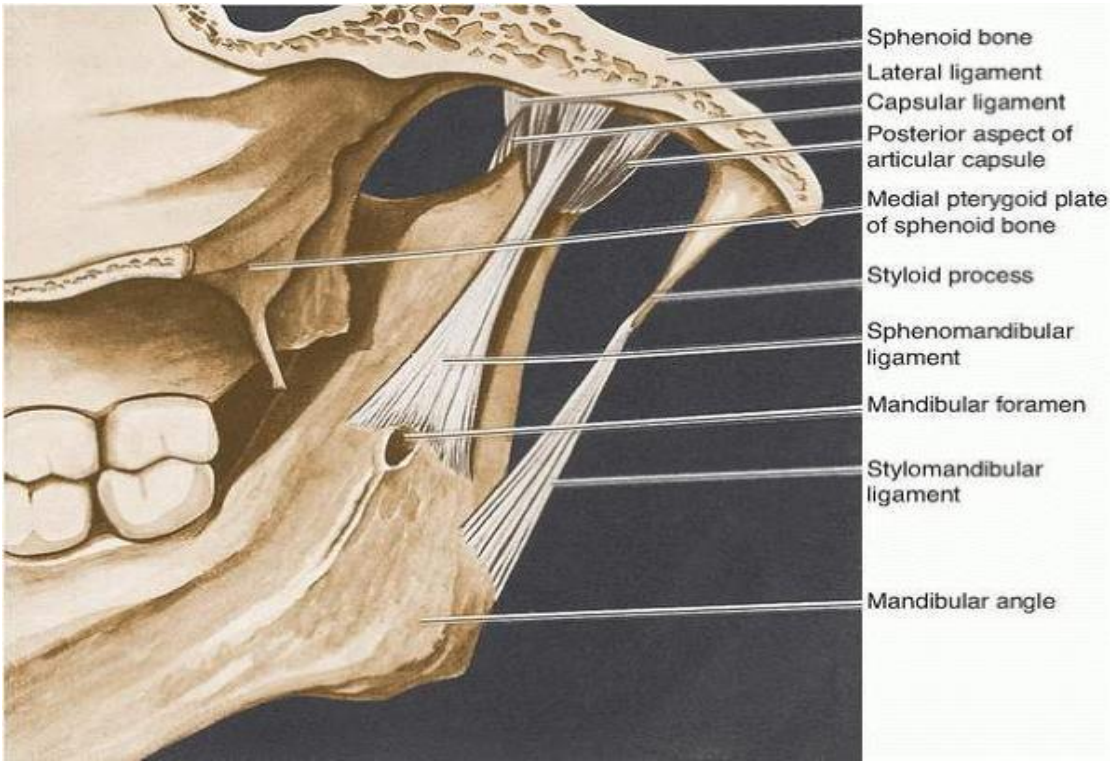


Figure (1-2) Ligaments of TMJ. (www.dentallecnotes.blogspot.com)

1.2.2.3 Muscles Associated with Mandibular Movement and Function

Muscles of mastication:

The muscles of mastication are the paired masseter, medial and lateral pterygoid, and temporalis muscles.

• Masseter muscle

It is a powerful rectangular muscle of two portions, the superficial and deep portion. Its origin from the lower border and medial surface of the zygomatic arch and its fiber run downward and backward to be attached to the lateral aspect of the ramus of the mandible (Snell, 2000), figure (1-3).

• Temporalis

It is a fan shaped muscle of three parts anterior, middle and posterior. It arises from the bony floor of the temporal fossa and from the deep surface of the temporal facia (Snell, 2000).

The muscle fibers are converging into a tendon that inserts on the coronoid process and anterior aspect of the mandibular ramus (Greenberg et al., 2004); figure (1-3).

• **Medial pterygoid**

It is a powerful rectangular muscle has two heads, the superficial head arises from the tuberosity of the maxilla and the deep head arises from the medial surface of the lateral pterygoid plate. Its fibers are run downward, backward and laterally inserted into the medial surface of the angle of the mandible (Snell, 2000); figure (1-3).

• **Lateral pterygoid**

It is divided into two parts; the inferior part arises from the outer surface of the lateral pterygoid plate of the sphenoid and the pyramidal process of the palatine bone and the superior part originates from the greater wing of the sphenoid and the pterygoid ridge. The fibers of the upper and lower heads run posteriorly and laterally, fusing in front of the condyle. They insert into the most anterior medial portion of the disk (Carpentier et al, 1988), figure (1-3).

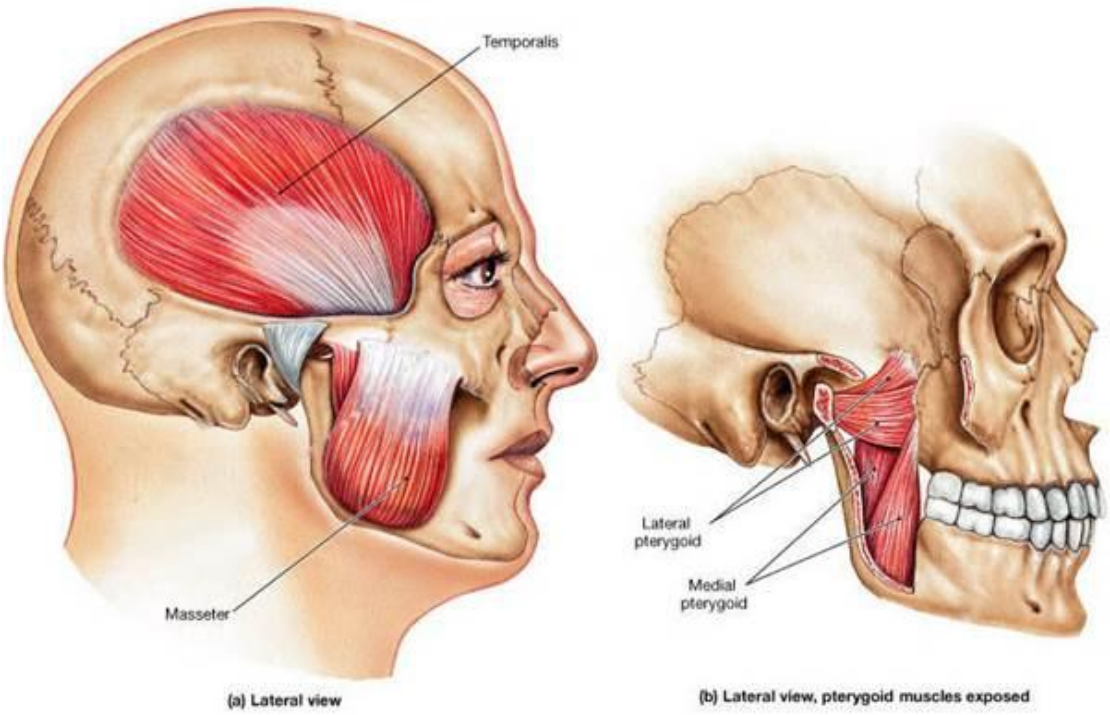


Figure (1-3) Muscles of mastication. (www.buism.com)

Accessory to masticatory muscles (Snell, 2000)

• The digastric muscle is a paired muscle with two bellies; the posterior belly arises from the mastoid process of the temporal bone, passes downward and forward across the carotid sheath and ends in the intermediate tendon which is held to hyoid bone by fascial sling. The anterior belly attaches to the lingual aspect of the mandible at the parasymphysis and courses backward to insert into the tendon.

• The mylohyoid muscle is flat triangular sheet of muscle arises from the mylohyoid line of the mandible and inserted into the body of the hyoid bone.

• The geniohyoid muscle is a narrow muscle that is laid above the mylohyoid. Its origin is from the inferior mental spine and inserted onto the anterior surface of the body of the hyoid bone.

• The buccinator muscle originates from the outer surface of the alveolar margins of the maxilla and mandible opposite the molar teeth and from the pterygomandibular ligament.

Its fibers insert anteriorly into mucosa, skin, and lip. The muscle helps position the cheek during chewing movements of the mandible (Greenberg et al., 2004)

1.2.2.4 Blood Supply of Temporomandibular Structures:

The external carotid artery is the main blood supply for the temporomandibular structures. The artery leaves the neck and courses superiorly and posteriorly, embedded in the substance of the parotid gland. The artery sends two important branches, the lingual and facial arteries, to supply the region. At the level of the condylar neck, the external carotid bifurcates into the superficial temporal artery and the internal maxillary artery. These two arteries supply the muscles of mastication and the TMJ .Arteries within the temporal bone or mandible may also send branches to the capsule (Greenberg et al., 2004).

1.2.2.5 Nerve Supply of Temporomandibular Structures:

The masticatory structures are innervated primarily by the motor fibers of trigeminal nerve, but cranial nerves VII, IX, X and XI and cervical nerves 2 and 3 also contribute (Martin et al, 2008).

1.2.3 Temporomandibular Joint Muscle Control

A single bone joins both TMJs so movement in one joint cannot occur without either similar coordinating or dissimilar reactive movements in the other joint. Opening, closing, protraction and retraction are bilateral symmetric movement. Lateral excursions are bilateral asymmetric movements.

Mandibular opening is produced by contraction of lateral pterygoid muscles with assistance from the digastric, geniohyoid and mylohyoid muscles. The masseter, medial pterygoid, and anterior fibers of the temporalis muscles are involved in mandibular closing.

Protrusion of the mandible is accomplished by the lateral pterygoid muscles and less effectively, medial pterygoid and the superficial fibers of masseter which also prevent the lateral pterygoid opening the mouth.

While retruded position is produced by contraction of the posterior fibers of the temporalis muscle.

Lateral movement of the mandible occurs when the lateral pterygoid muscle contract alternately (Greenberg et al., 2004).

1.2.4 Normal Function of Temporomandibular Joint:

At rest, the condyle is seated passively in the temporal fossa with the disc interposed at the most superior and anterior position of the condyle.

When the mouth opens, two distinct motions occur at the joint. The first motion is rotation around a horizontal axis through the condylar heads. The second motion is translation. The condyle and disk move together anteriorly beneath the

articular eminence. When the mouth is fully open, the condyle may lie beneath the anterior band of the disk.

In the closed mouth position, the thick posterior band of the disk lies immediately above the condyle. As the condyle translates forward, the thinner intermediate zone of the disk becomes the articulating surface between the condyle and the articular eminence (Thurman and Michael, 1994), figure (1-5).

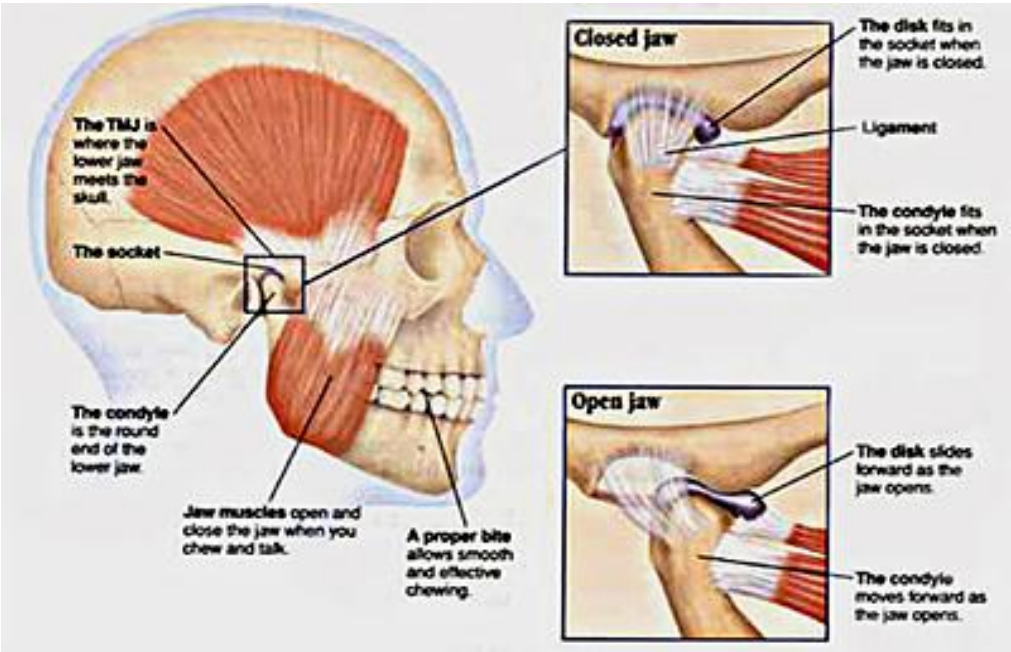


Figure (1-4) Normal motions of TMJ. (www.morphopedics.wikidot.com)

1.3 Temporomandibular Disorders (TMDs)

Temporomandibular disorders (TMDs) refer to collection of disorders characterized by: pain in the temporomandibular joint (TMJ), the periauricular area, or the muscles of mastication; TMJ noises (sounds) during mandibular function; and deviations or limitation in mandibular range of motion (Laskin et al., 1983).

These conditions have failed to demonstrate a common etiology or biological basis in terms of clear signs and symptoms, therefore, are considered a heterogeneous group of health problems related to chronic pain (Maydana et al, 2010).

1.3.1 Etiology:

Etiology The etiology of TMD is multifactorial and includes biologic, environmental, social, emotional, and cognitive triggers. Factors consistently associated with TMD include other pain conditions (e.g., chronic headaches), fibromyalgia, autoimmune disorders, sleep apnea, and psychiatric illness (Scrivani et al, 2008).

Smoking is associated with an increased risk of TMD in females younger than 30 years (Sanders et al, 2012).

Some of the factors proposed are the following:

1. Parafunctional habits (e.g. nocturnal bruxing, tooth clenching, lip or cheek biting) (Rough and Harlan, 1988; Moss et al., 1995).
2. Emotional distress (Southwell et al.,1990 ; Flor et al., 1991).
3. Acute trauma from blows or impacts (Isacsson et al., 1989).
4. Trauma from hyperextension (e.g. dental procedures, oral intubation for general anesthesia, yawning, hyperextension associated with cervical trauma) (Braun et al., 1992).
5. Instability of maxillomandibular relationships (Riolo et al., 1987).
6. Laxity of the joint (Buckingham et al.,1991).
7. Comorbidity of other rheumatic or musculoskeletal disorders (Neill, 1993).
8. Poor general health and an unhealthy lifestyle (Parker, 1990).

1.3.1.1 The Value of Stressful Experiences Contribute to the Development of Temporomandibular Disorders:

Laskin 1969, was the first to suggest that the main factor responsible for TMD is the emotional instead of the physical aspect, he merge both biological and psychological aspects and according to this concept, people react to stress with

different systems in the body, some react via the head and neck muscles and develop TMDs. There is currently considerable evidence that psychological factors are of importance in the understanding of TMDs, but there is less evidence that these factors are etiologic. Although there is strong evidence that some patients with TMDs are more anxious and/or depressed compared with asymptomatic controls (Gamerio et al, 2006).

Psychological studies have shown that patients with functional disorders of the temporomandibular region have similar psychological dysfunction as other chronic musculoskeletal pain disorders, such as tension type headache and back or arthritic pain (Dworkin and Massoth, 1994; Suvinen and Reade, 1995; Suvinen et al, 1997).

DeLeeuw et al 1994, consider that muscle dysfunction and accompanying pain are very often the result of stress induced muscular hyperactivity. Stressinduced muscular dysfunction may induce secondary changes in the TMJ.

A proposed integrated biopsychological model of how stress may impact on TMD can be drawn figure (1-6), (Gameiro et al., 2006).

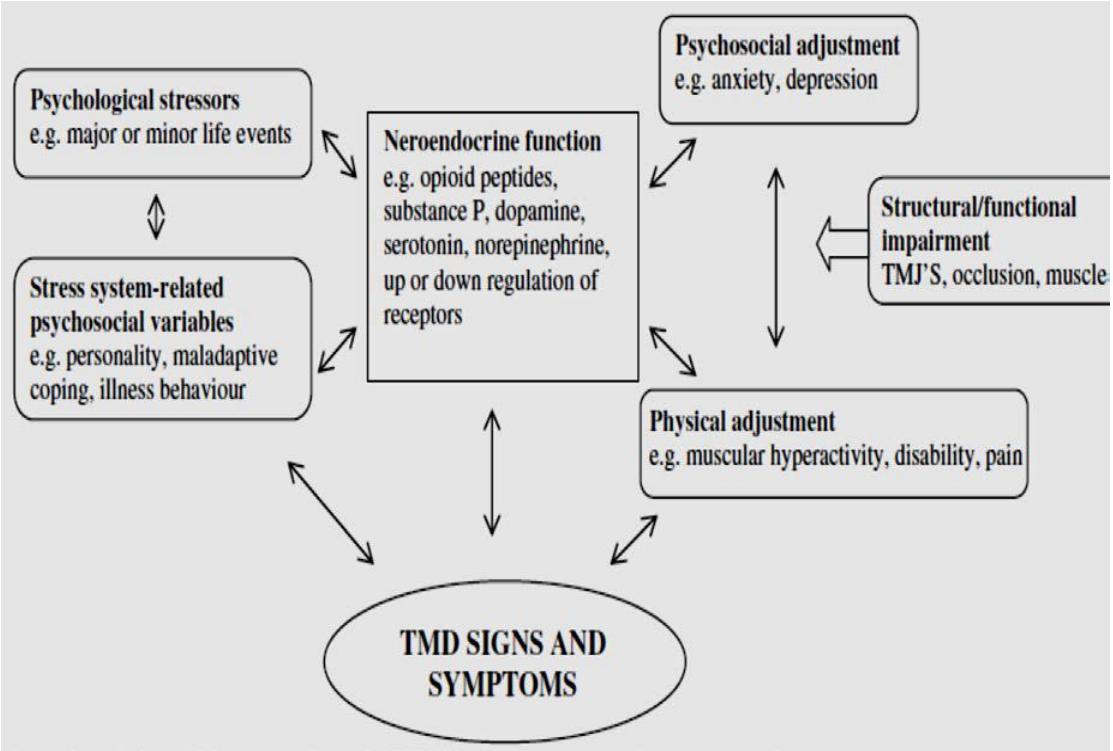


Figure (1-5) Diagram illustrating the cycle stress-pain-stress that can occur in TMD patients (Gameiro et al., 2006).

Geissler1985, used biochemical evidence (urinary cortisol:creatinine ratios) to show that patients with TMDs have higher urinary cortisol than normal individuals and therefore they are under greater emotional stress. It is possible that high levels of cortisol in TMDs patients represent a physiological response to chronic stress, with pain as a potential stressor, associated with chronically increased CRH or other HPA axis central mediators. Increased activation of the central components of stress system may result in hyperalgesia (Lariviere and Melzack, 2000).

The women showed more signs and symptoms of TMDs, and higher prevalence due to an interaction of a variety of factors ranging from biological and hormonal factors to psychological and social ones (Kuttila et al,1998). The diagnosis, assessment, and management of TMDs must include both physical (e.g., TMJ, occlusion, and muscles) and psychological (e.g., personality, affective states, and distress) factors (Gamerio et al, 2006).

1.3.2 Classification:

Current diagnostic classifications of TMDs are based on signs and symptoms because of the uncertainty about etiology. Earlier classifications of disorders as intracapsular (TMJ) or extracapsular (muscle) disorders were not multifaceted enough to allow for multiple diagnoses of masticatory muscle and TMJ abnormalities(Fricton et al, 1990 and Truelove et al, 1992).

There is currently based consensus among researchers and clinicians internationally on the most widely studied classification for the most common TMD, to provide a system that could be used in clinical research which is the Research Diagnostic Criteria for TMDs (RDC/TMD) that developed at the University of Washington , RDC/TMD were published as a system to allow standardization and replication of research for the most common forms of muscle and joint-related TMDs (Dworkin and LeResche ,1992).

The RDC/TMD, a dual axis diagnosis and classification system designed for clinical research on TMDs, consist of methods for the physical classification of TMDs diagnoses (Axis I) and methods to assess the intensity and severity of chronic pain

and levels of non-specific depressive and physical symptoms (Axis II). RDC/ TMD reliability has been tested and found to be satisfactory in adult populations (Dworkin et al, 1990 and Dworkin et al, 2002).

The axis I of the RDC/TMD classification system is a clinically based assessment considering both subjective and clinical parameters of evaluation. It supplies criteria for the diagnosis of three main groups of disorders: muscles disorders (group I) are diagnosed on the basis of anamnestic reports of pain in the muscles of mastication and clinical assessments of pain by palpation of at least three of twenty muscular sites in the facial area (ten for each side). When criteria for group I diagnosis are satisfied, a diagnosis of myofascial pain has to be put, and it will be with or without restricted mouth opening on the basis of the jaw range of motion, disc displacements (group II) and other joint disorders,

such as arthralgia, osteoarthritis and osteoarthrosis (group III). As for

psychosocial diagnosis (axis II), a rating of jaw disability, chronic pain, and depression is provided by the use of validated questionnaires, to assess the psychosocial aspects at therapeutical level (Manfredini et al, 2007).

1.3.3 Sings and Symptoms of Temporomandibular Disorders:

It is important to identify both signs and symptoms clearly. A sign is an objective clinical finding that the clinician uncovers during clinical

examination. A symptom is a description or complaint reported by the patient.

1.3.3.1 Myogenic Disorders:

Disorders of masticatory muscles are probably the most common

complain of patients seeking treatment in the dental office (Schiffman et al., 1990). It has been reported that approximately 50% of all TMDs are masticatory (Stohler, 2000). The two major symptoms of myogenic disorders are pain and dysfunction so divided into myofascial pain(MFP) and myofascial pain and dysfunction syndrome (MPD) when there is accompanying limitation in jaw opening (Ogle and Hertz, 2000).

The muscle pain range from slight tenderness to extreme discomfort and associated with a feeling of muscle fatigue and tightness. Patients will usually describe the location of the pain as broad or diffuse, and the pain is often bilateral. This complaint is quite different than the specific location reported in intracapsular disorders. The severity of muscle pain is generally directly related to the amount of functional activity. If the patient does not report an increase in pain associated with jaw function, the disorder is not related to a masticatory muscle problem and other diagnoses should be considered (Okeson and de Leeuw, 2011).

Clinically, myofascial pain is characterized by the presence of localized, firm, hypersensitive bands of muscle tissue called trigger points. These areas create a source of deep pain input that can lead to central excitatory effects resulting in pain referral. This condition manifests as pain on palpation with referral of pain to the surrounding or remote tissues (Simons et al, 1999).

While dysfunction, clinically may be seen as a decrease in the range of mandibular movement. When muscle tissues have been compromised by overuse, any contraction or stretching increases the pain, therefore the patient restricts movement within a range that does not increase pain. The restriction may be at any degree of opening depending on where discomfort is felt. In many myalgic disorders the patient is able to slowly open wider but this increases the pain (Mense, 2003).

MFP of the masticatory muscles is more frequently induced by stressrelated parafunctional habits (ie, clenching and grinding) and rarely by mechanical causes such as malocclusion or high dental restorations (Herb et al, 2006). The increase of muscle use by parafunction is causing muscle pain due to vasoconstriction of the relevant nutrient arteries and the accumulation of metabolic waste products in the muscle tissues (Mense, 2003). But parafunctions like daytime clenching or sleep related bruxing, chewing gums and biting lips, cheeks, fingers and nails are common and do not lead to pain in most individuals. Studies reveal that the resting activity of the masticatory muscles as measured by electromyography of patients with chronic

muscle pain is not different with those of asymptomatic controls, so the majority of masticatory muscle pain patients are not experiencing spasms.

It is now accept that muscle pain can be influenced and actually initiated by the central nervous system through antidromic effects leading to neurogenic inflammation in the peripheral structures. When these peripheral structures are muscles, this is clinically felt as muscle pain. This type of muscle pain is called "centrally mediated myalgia" and can be a difficult problem to manage since the peripheral structures, such as teeth, jaw, and muscles are not the significant cause of the pain. By the involvement of the central mechanisms, increased levels of emotional stress and other sources of deep pain may likely influence masticatory muscle pain disorders (Okeson, 2005).

1.3.3.2 Articular Disorders

The signs associated with articular disorders of the TMJ are probably the most common findings when examining a patient for masticatory dysfunction.

Many of these signs do not produce painful symptoms and, therefore, the patient may not seek treatment. While the two major symptoms of articular disorders are pain and dysfunction. Joint pain can arise from healthy joint structures that are mechanically abused during function, from impingement of tissues, or from structures that have become inflamed. Pain originating from healthy structures or impingements is felt as sharp, sudden, and intense pain that is closely associated with joint movement. When the joint is rested, the pain resolves instantly. The pain is often localized to the preauricular area. If the joint structures have become inflamed, the pain is constantly dull or throbbing, even at rest. Dysfunction is common and usually presents as a disruption of the normal condyle-disc movement often with the production of joint sounds. The joint sounds may be a single event of short duration known as a click. If this is loud, it may be referred to as a pop. Crepitation is a multiple, rough, gravel like sound described as grating or grinding. Dysfunction of the TMJ may also present as catching sensations when the mouth is opened. Sometimes the jaw may lock (Okeson and de Leeuw, 2011).

The articular disorders divided into three broad categories: articular disk displacement (internal derangement), structural incompatibility of the articular surfaces, and inflammatory joint disorders.

• **Articular Disk Displacement**

Anterior disc displacement (ADD) is the most common articular derangement, defined as "a disturbance in the normal anatomic relationship between the disc and condyle that interferes with smooth movement of the joint and causes momentary catching, clicking, popping, or locking" (Laskin,1994).

ADD is divided into:

1. Anterior disk displacement with reduction.

When the articular disc becomes displaced anteriorly,there is excessive stretching of the retrodiscal tissue, which then bears repeated loading force from the mandibular condyle, adapt to these forces and may transform into a "pseudodisc." But the disc is recaptured resulting in TMJ noise (clicking or popping) and full translational movement of the condyle. With a reciprocal (closing) click represents the condyle returning to the retrodiscal tissue and the disc returning to an anterior position. ADD with reduction does not require treatment unless there is accompanying joint pain (Herb et al,2006).

2. Anterior disk displacement without reduction

In disk displacement without reduction, the disk remains displaced relative to the condylar head, regardless of the jaw position, allowing only for rotational and not translational movement. In the initial stages of this condition, jaw opening is typically limited and the jaw deviates to the side of the affected joint. However, this clinical characteristic is typical only during the initial (early) phase; with time, the opening capacity of the TMJ increases and the jaw no longer deviates to the affected side. This is the result of stretching or progressive elongation of the posterior disk attachment and, to a lesser extent, deformation of the disk itself. In the early stage,

disk displacement without reduction is usually not associated with joint sounds. Additionally, excursive mandibular movements to the contralateral side are limited (Herb et al, 2006).

• **Structural Incompatibility of the Articular Surfaces**

Some articular disorders result from problems between the articular surfaces of the joints. Adherences are the temporary sticking of articular surfaces, where as adhesions are more permanent. Adherences may develop between articular surfaces even in the presence of sufficient fluid. When a joint is statically loaded a small amount of synovial fluid is expressed from the articular surfaces and lubricates them (weeping lubrication). As soon as the joint moves the reservoir of fluid in peripheral area of the joint relubricates the surfaces, preparing them for future loading (boundary lubrication). If static loading continues for a prolonged time, weeping lubrication can become exhausted and sticking of the articular surface can result (Jeffrey, 2008).

When static loading is finally discontinued and movement begins, a sense of stiffness is felt in the joint until enough energy is exerted to break apart the adhering surfaces. This breaking apart of adherences can be felt as a click, and it denotes the instant return to normal range of mandibular movement. The term adherence implies that the articular structures have become temporarily stuck together but there have not been any changes to physically bind the tissues together. If the adherence remains for a significant period of time, fibrous tissue can develop between the articular structures and a true adhesion can develop.

This condition represents a mechanical connection that limits normal condyle/disc/fossa function on a more permanent base. Closed mouth trauma is the specific type of injury that leads to adhesions (Murakami et al, 1992).

1.3.3.3 Inflammatory Joint Disorders:

Inflammatory joint disorders are a group of disorders in which various tissues that make up the joint structure become inflamed as a result of insult or breakdown. Any or all joint structures may be involved. Unlike disc derangement disorders, in

which pain is often momentary and associated with joint movement, inflammatory disorders are characterized by constant, dull, aching pain that is accentuated by joint movement (Jeffrey, 2008).

1.3.3.3.1 Arthritides:

Joint arthritides represent a group of disorders in which destructive bony changes are seen. One of the most common types of TMJ arthritides is called osteoarthritis, a degenerative joint disease DJD, is primarily a disorder of articular cartilage and subchondral bone, with secondary inflammation of the synovial membrane. It is a localized joint disease without systemic manifestations. The process begins in loaded articular cartilage, which thins and clefts and then breaks away during joint activity. This leads to sclerosis of underlying bone, subcondylar cysts, and osteophyt formation (Boering et al, 1990).

The causes may be chronic microtrauma or pressure. The microtrauma may be in the form of continuous abrasion of the articular surfaces as in natural wear associated with age or as increased loading forces possibly related to chronic parafunctional habits (Pullinger et al, 1990).

Degenerative joint disease may be divided into primary and secondary . Primary degenerative joint disease is of unknown origin, but genetic factors play an important role, often asymptomatic and is most commonly seen in patients above the age of 50 years, although early articular changes can be observed in younger individuals. Secondary degenerative joint disease results from a known underlying cause, such as trauma, congenital dysplasia, or metabolic disease (Greenberg etal., 2004).

The relationship between internal derangements and DJD is unclear, but a higher frequency of radiographic signs of DJD was observed in subjects with disk displacement without reduction (Katzberg et al, 1982).

Many patients with mild to moderate DJD of the TMJ have no symptoms although arthritic changes are observed on radiographs. Patients with symptomatic DJD of the TMJ may have unilateral pain directly over the condyle, limitation of mandibular

opening, crepitus, and a feeling of stiffness after a period of inactivity. Examination shows tenderness and crepitus on intraauricular and pretragus palpation with deviation of the mandible to the painful side. Radiographic findings in DJD may include narrowing of the joint space, irregular joint space, flattening of the articular surfaces, osteophytic formation and anterior lipping of the condyle (Greenberg et al., 2004).

1.3.3.3.2 Rheumatoid Arthritis:

Rheumatoid arthritis (RA) is a chronic, systemic inflammatory disorder that may affect many tissues and organs, but principally the synovial joints. The TMJs are involved in approximately half of cases (Coulthard et al, 2003).

The disease process starts as a vasculitis of the synovial membrane, progresses to chronic inflammation marked by an intense round cell infiltrate and subsequent formation of granulation tissue. The cellular infiltrate spreads from the articular surfaces to cause an erosion of the underlying bone (Greenberg et al., 2004).

RA is usually involved the TMJs bilaterally. The most common symptoms include pain and limitation of mandibular opening. Pain is usually associated with the early acute phases of the disease but is not a common in later stages. Morning stiffness, joint sounds, tenderness and swelling over the joint area are often experienced by the patients (Stabrun et al., 1989).

The symptoms are usually temporary, and only some of patients with RA of the TMJs will experience permanent clinically significant disability (Greenberg et al., 2004).

1.3.3.3.3 Septic Arthritis:

Septic arthritis of the TMJ most commonly occurs in patients with previously existing joint disease such as rheumatoid arthritis, or underlying systemic disease, particularly diabetes. Patients on immunosuppressive drugs or long term corticosteroids also have an increased chance of having septic arthritis. The infection of the TMJ may result from blood borne bacterial infection or by extension of

infection from adjacent sites such as the middle ear, maxillary molars, and parotid gland (Bounds et al, 1987).

Symptoms of septic arthritis include trismus, deviation of the mandible to the affected side, severe pain on movement, and inability to occlude the teeth due to the presence of inflammation in the joint space.

Examination reveals redness and swelling in the region of the involved joint, the swelling may be fluctuant and extend beyond the region of the joint (Hincapie et al, 1999).

Large tender cervical lymph nodes are frequently observed on the side of the infection and this helps in diagnosis of septic arthritis from other types of TMJ disorders (Greenberg et al., 2004).

1.3.3.4 Trauma:

Trauma is subdivided into:

1-Macrotruama:

Macrotruama leads either to fracture of the condyle head and neck or to less commonly dislocation of the mandible when the condyle is positioned anterior to the articular eminence and cannot return to its normal position without assistance, and may be unilateral or bilateral. The patient with a condylar fracture usually presents with pain and edema over the joint area and limitation and deviation of the mandible to the injured side on opening. Bilateral condylar fractures may result in an anterior open bite, While the typical complaints of the patient with dislocation are an inability to close the jaws and pain related to muscle spasm. On clinical examination, a deep depression may be observed in the pretragus region corresponding to the condyle being positioned anterior to the eminence (Greenberg et al., 2004).

2-Microtruama:

Microtrauma refers to any small force that is repeatedly applied to the joint structures over a long period of time such as bruxism and high spots. If loading exceeds the functional limit of the tissue, irreversible changes or damage can result. When the functional limitation has been exceeded, the collagen fibrils become

fragmented, resulting in a decrease in the stiffness of the collagen network. This allows the proteoglycan-water gel to swell and flow out into the joint space, leading to a softening of the articular surface. This softening is called chondromalacia (Stegenga, 1991).

The early stage of chondromalacia is reversible if the excessive loading is reduced. If the loading continues to exceed the capacity of the articular tissues, irreversible changes can occur. Regions of fibrillation can begin to develop, resulting in focal roughening of the articular surfaces (Dijkgraaf et al, 1995).

This alters the frictional characteristics of the surface and may lead to sticking of the articular surfaces, causing changes in the mechanics of condyle disc movement.

Continued sticking and/or roughening leads to strains on the discal ligaments during movement and eventually disc displacements (Stegenga, 1991).

- **Other Symptoms Associated with Temporomandibular Disorders**

Many studies reveal that headache is a common symptom associated with TMDs (Ciancaglini and Radaelli, 2001 and Liljestrom et al, 2005).

Patients with myogenic disorders have complaints beyond the masticatory system, mostly in the head, neck and back areas (Hagberg et al, 1994).

Symptoms appear less often but may also relate to functional disturbances of the masticatory system, some of these are ear complaints, such as pain, tinnitus, buzzing, noises and blockage (Kuttila et al., 1999).Vertigo has also been reported by some patients (Okeson, 1989).

1.3.4 Diagnosis of Temporomandibular Disorders

Diagnosis could be achieved by two steps:

1.3.4.1 Clinical Examination:

1- History:

The patient should be asked about the presence of TMJ pain, noises that occur with chewing or yawning, a history of trauma, and ear pain. Questions about the involvement of other joints in the body are also important because this finding can be

indicative of osteoarthritis or rheumatoid arthritis, so taking thorough medical history, dental history and personal history (Knight, 1999).

2-Physical Examination:

Physical examination is primarily include the inspection of facial asymmetry, swelling, and masseter and temporal muscle hypertrophy and notice the opening pattern whether its straight, deviated or deviated with correction (NIH, 1996).

Assessment of range of mandibular movement by measuring the maximum mouth opening with comfort, with pain and with clinician assistance, thus to differentiate the restrictions due to muscle or joint, also evaluate the maximum lateral and protrusive movements (Greenberg et al., 2004).

Palpation of masseter ,temporalis, anterior digastric, sternocleidomastoid and trapezius muscles and the muscles inside the mouth which are the lateral and medial pterygoid muscles to detect any tenderness. Palpation of the joint and the muscles for pain should be done with the muscles in a resting state. The methods for palpation are not standardized in clinical practice. The amount of pressure to apply and the exact sites that are most likely associated with TMD are unknown. The RDC/TMD guidelines recommend 1 lbs. of pressure for the joint and 2 lbs. of pressure for the muscles (Dworkin and LeResche ,1992).

Palpation of the TMJ palpated on both sides of the face with mouth open and close to reveal pain and irregularities during condylar movement, and joints sounds like clicking and crepitus. The lateral pole of the condyle is most accessible for palpation during mandibular movements. In addition to joint noises and pain, there may be palpable differences in the form of the condyle when comparing right and left.

Assessment of parafunctional habits by the examination of tooth wear, multiple fracture of enamel and restorations, and soft-tissue changes like lip or cheek chewing, a hyperplastic occlusal line, and scalloped tongue borders (Greenberg et al., 2004).

1.3.4.2 Imaging:

Several methods are available for imaging the TMJ including:

1-Basic radiography for hard tissues.

2-Arthrography when an indirect image of the disc is obtained by injection of a radiopaque contrast agent into one or both joints spaces under fluoroscopic guidance with opportunity for minor surgical treatment (Coulthard et al, 2003).

3-Ultrasonography and magnetic resonance imaging enable visualizing of soft tissues such as the disc, ligaments, and muscles to be useful in diagnosis of internal derangement or joint dysfunction (Takaku et al, 1998).

4-Cone beam computed tomography is a new technology provides three dimensions 3-D imaging of the oral and maxillofacial complex uses a low quantity of radiation and provides insight into anatomy as an adjunct to two dimensions 2-D imaging. As 3-D imaging becomes more prevalent, better diagnosis, treatment planning, and surgical experience can be achieved to improve patient care (Howerton and Mora, 2008).

1.3.5 Treatment of Temporomandibular Disorders:

Treatment of TMDs is typically involve many elements, and the selection from among and within these elements depends on the comprehensive assessment of each patient (Fricton, 1995).

Treatment is aimed towards symptomatic relief and not cures, since most of the conditions that affect the temporomandibular system are untreatable. It should be conservative and reversible , and if this failed, irreversible treatment such as surgery should be offered but only in extreme conditions (Jerjes et al, 2008).

• Home care

Homecare practices are number one for most clinicians. Commonly used homecare measures may include avoidance of parafunctional habits, change to a soft consistency diet, limited talking, and avoidance of wide yawning, use of physical therapy such as local application of ice for acute pain or heat for low-grade chronic pain. Passive or active jaw exercises have been recommended for joint clicking,

restricted opening, irregular mandibular movement, lack of muscle coordination, and recurrent anterior dislocation of the condyle (Selby, 1985).

The results of one study of the effect of physical therapy in the management of internal derangement of temporomandibular joint revealed that exercises and physiotherapy effectively reduced pain and improved jaw opening in 53% of patients with reciprocal TMJ clicking (Kirk et al, 1989).

• **Dental techniques**

Dental techniques are including the following:

1-Splint therapy is one of the most disputed issues in the management of TMDs, and a variety of occlusal splint designs has been used (Kafas et al, 2007). The most common type is a hard intraocclusal splint, which covers the maxillary or mandibular teeth, preventing the grinding behavior from causing additional damage to the teeth. Theoretically, the splints reduce masticatory muscle activity (Clark et al, 1979).

Anterior repositioning splints were found to be more effective than flat plane splints in eliminating reciprocal clicking and TMJ tenderness, and may also be valuable in reducing myogenic tenderness. However, clicking often returns(Lundh et al,1988).While soft splints may reduce TMD-related headaches and clicking (Quayle et al, 1990), but their effect is not always significant, particularly in the long-term, and may cause a worsening of symptoms (Okeson, 1987).

2-Occlusal adjustment involves repositioning the mandible in a centric position by prosthodontic or orthodontic means and/or occlusal equilibration or adjustment done by selective grinding of teeth to have better fitting between the maxillary and mandibular teeth ,but the occlusal adjustment is rarely needed because the researches indicate that occlusal factor do not typically contribute to the etiology of TMDs (Clark et al,1999).

Selective grinding is indicated when :

a- The occlusal appliance has eliminated the occlusal symptoms.

b- Attempts to identify the feature of the appliance that affects the symptoms have revealed that it is the occlusal contact or jaw position (Jeffrey, 2008).

• **Pharmacotherapy**

Mild analgesic, nonsteroidal anti-inflammatory analgesic drugs (NSAIDs), antianxiety agents, tricyclic antidepressants, and muscle relaxants are medications used as part of initial treatment. Drug therapy as part of TMD management should follow the general principles of analgesic therapy and be used on a fixed dose schedule rather than as needed for pain (Martin et al, 2008).

• **Surgery**

Surgery is indicated only in specific articular disorders, especially when there is no response usually to conservative treatment, and the patient's quality of life has been significantly affected (Okeson, 1996).

Surgical management may vary from closed surgical procedures, such as arthrocentesis and arthroscopy, to more complex open joint operations, like arthrotomy, disk repositioning, diskectomy and condylotomy (Dolwick, 1997).

• **Complementary therapy**

Acupuncture therapy, dry needling and trigger point injections may provide some reduction in local pain and tenderness, but these benefits last less than six months (List et al, 1993).

The infrared therapy has a significant role in lowering the hyperactivity of the masticatory muscles (Kameel, 2005).

• **Cognitive-behavioral therapy**

Cognitive-behavioral programs utilize a variety of techniques that help patients to identify cognitive, behavioral and environmental triggers of pain, to develop strategies for coping more effectively with pain and its consequences (Jerjes et al, 2008).

CBT is effective in reducing pain and disability in TMDs patients particularly in combination with other treatment modalities, such as medication and biofeedback (Gardea et al, 2001).

Chapter Two

Materials and Methods

A cross-sectional descriptive study was carried out in March 2018 on fifth year dental students from college of Dentistry, university of Baghdad using a modified form of dental environment stress (DES) questionnaire (Al-Samadani KH, Al-Dharrab ,2013). The DES consists of 29 close-ended questions in the English language that was applicable to Iraqi dental students. Each question had three options: (1) No stress, (2) mild to moderate stress and (3) severe stress.

The questionnaires were distributed during lectures and in free time and students were asked to submit the completed questionnaire the following day and were examined for any muscle of mastication spasm.

A total of 203 questionnaires were distributed among fifth year dental students. Incomplete questionnaires were excluded from the study.

Ethical permission was obtained from the Research ethics Committee of the college of Dentistry, university of Baghdad. Students were instructed not to write their name to ensure anonymity and confidentiality.

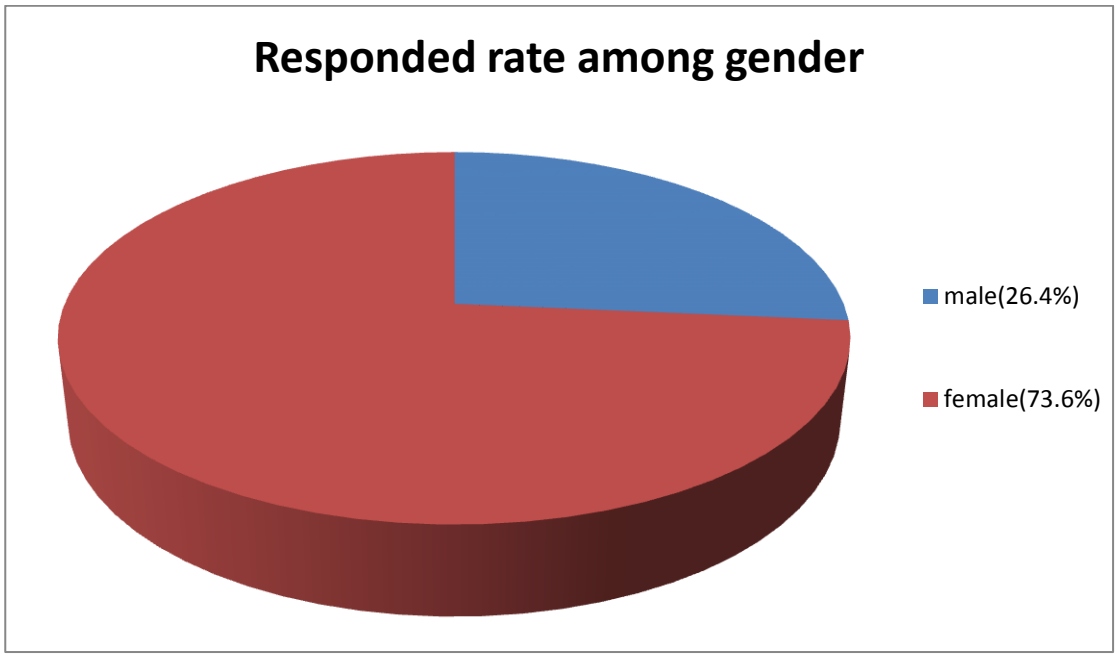
Chapter Three

RESULTS

3.1 study sample:

A total of 203 students of fifth stage college of dentistry, university of Baghdad were asked to complete the questionnaire in march 2018, and 140 **(68.9%)** responded; 103 **(73.6%)** were females and remaining 37 **(26.4%)** were males , with mean age (**22.7)** ∓SD **(0.48).**

Figure 3-1 shows the responded rate among gender.



(Figure 3-1) The responded rate among gender**.**

3.2 The answers of student questioners and factors that were responsible for severe stress are displayed in descending order:

A total of 203 students were asked to complete the questionnaire and 140 **(68.9%)** responded; More or less all the students were having stress. In all students severe stress was due to difficulty in getting suitable patient **(50%)** and , lack of time to do assigned work **(50%)** followed by Distance and time needed to travel dental

college **(47.1%) ,** while Inconsistency of feedback regarding work have the lowest percentage **(6.4%)** as showing in table 3-1

S. no. Questionnaires	*No. Stress*		*Mild to moderate stress*		*Severe stress*	
	N	*%*	*N*	*%*	*N*	*%*
1-Difficulty to get suitable patients	**21**	**15**	**49**	**35**	**70**	**50**
2-Lack of time to do assigned work	**20**	**14.2**	**50**	**35.7**	**70**	**50**
3-Distance and time needed to travel dental college	**21**	**15**	**43**	**30.7**	**66**	**47.1**
4-Fear of getting infectious diseases like HIV, HBV, etc.	**31**	**22.1**	**52**	**37.1**	**57**	**40.7**
5-Fear of failure ***Q.N***	**13** ***N***	**9.2** **%**	**72** **N**	**51.4** **%**	**55** **N**	**39.2** **%**
6-Completing examination requirements	**23**	**16.4**	**63**	**45**	**54**	**38.5**
7-Examination and grading	**28**	**20**	**63**	**45**	**49**	**35**
8-Amount of academic over load	**31**	**22.1**	**62**	**44.2**	**47**	**33.5**
9-Difficulty in understanding lectures	**47**	**33.5**	**46**	**32.8**	**47**	**33.5**
10-Patient arriving late or not coming on appointment	**28**	**20**	**69**	**49.2**	**43**	**30.7**
11-Lack of cooperation by patients in clinic and home care	**45**	**32.1**	**55**	**39.2**	**40**	**28.5**
12-Lack of confidence about being a successful dental students	**39**	**27.8**	**66**	**47.1**	**35**	**25**
13-Difficulty in learning clinical procedures	**58**	**41.4**	**52**	**37.1**	**30**	**21.4**
14-Financial problem	**52**	**37.1**	**58**	**41.4**	**30**	**21.4**
15-Attitude of faculty toward students	**60**	**42.8**	**51**	**36.4**	**29**	**19.3**
16-Difficulty with class work	**58**	**41.4**	**56**	**40**	**26**	**18.5**
17-Amount of cheating among dental students	**56**	**40**	**60**	**42.8**	**24**	**17.1**
18-Environment of extracurricular activities	**66**	**47.1**	**50**	**35.7**	**24**	**17.1**
19-Competition with class work	**48**	**34.2**	**70**	**50**	**23**	**16.4**
20-Conflict with the patients	**63**	**45**	**55**	**39.2**	**22**	**15.7**
21-Receiving criticism about work	**60**	**42.8**	**58**	**41.4**	**22**	**15.7**
22-Having children at home	**85**	**60.7**	**33**	**23.5**	**22**	**15.7**
23-Home atmosphere	**86**	**61.4**	**34**	**24.2**	**20**	**14.2**
24-Physical health problem	**88**	**62.8**	**32**	**22.8**	**20**	**14.2**
25-Rules and regulations of the faculty	**51**	**36.4**	**71**	**50.7**	**18**	**12.8**
26-Marital problem	**87**	**62.1**	**35**	**25**	**17**	**12.1**
27-Social contact with students	**94**	**67.1**	**30**	**21.4**	**16**	**11.4**

28-Responsibilities for comprehensive patient care	43	30.7	86	61.4	11	7.8
29-Inconsistency of feedback regarding work	63	45	68	48.5	9	6.4

Table (3-1) The answers of student questioners and factors that were responsible for severe stress are displayed in descending order.

3.3: the Distribution of muscle of mastication spasm among student of fifth stage collage of dentistry university of Baghdad:

A total of 140 students who completed the questionnaire they were examined to chick if they have any spasm in there muscle of mastication, a total of 43 students were found they have a spasm distributed on the muscles as shown in the table 3-2.

in this study it was found that the number of dental students that they had spasm in masseter muscle is 36 **(83.7%)**, 14 in the left side and 31 in the right side, and in temporalis is 14 **(32.5%)**, 9 in the left side and 12 in the right side, and in medial pterygoid is 3 **(6.9%)** bilaterally, while in lateral pterygoid is 11 **(25.5%)**, 6 in the left side and 9 in the right side as shown in figure(3-2).

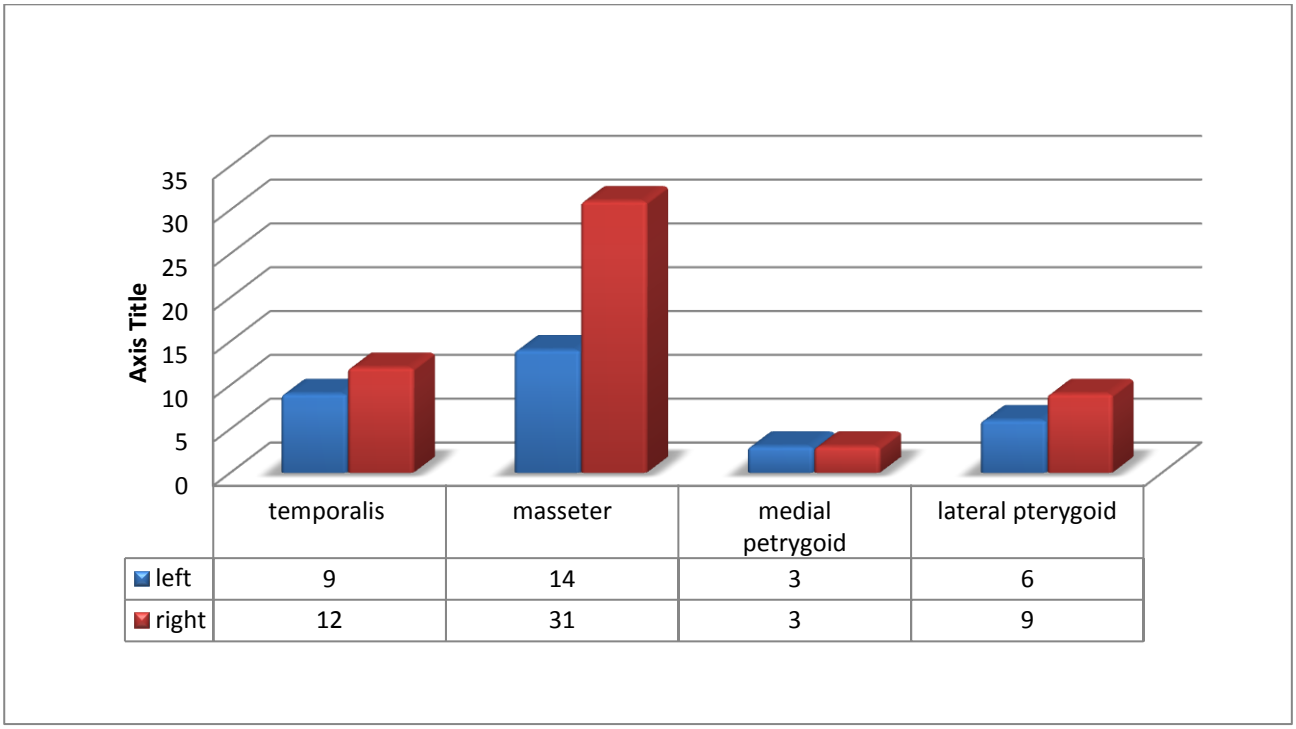


Figure (3-2) the Distribution of muscle of mastication spasm.

Chapter Four

DISCUSSION

4.1 The Perception of Stress among Clinical Dental Students:

This study was conducted at Department of oral diagnosis /oral medicine clinic , collage of dentistry, university of Baghdad.

A total of 203 students of fifth stage college of dentistry, university of Baghdad were asked to complete the questionnaire and 140 (68.9%) responded; the prevalence of stress was present among all the students and they suffered high degree of emotional stress. The first major cause of severe stress among dental students was due to difficulty in getting suitable patient (50%) and , lack of time to do assigned work (50%) followed by Distance and time needed to travel dental college (47.1%) , while Inconsistency of feedback regarding work have the lowest percentage (6.4%).

Results of this study disagree with (Alsamadani and aldhurab,2013) ,in their study The first major cause of severe stress among dental students was tension of examination and grading (55.6%) followed by amount of academic overload (53.4%) and fear of failure (51.3%).

4.2 Muscle of mastication spasm among student:

A total of 140 students of fifth stage collage of dentistry, university of Baghdad who completed the questionnaire they were examined to chick if they have any spasm in there muscle of mastication, a total of 43 students were found they have a spasm distributed on the muscles.

The role of stress and personality in the etiology of the temporomandibular pain dysfunction syndrome has undergone extensive scrutiny. Psychological studies have shown that patients with functional disorders of the temporomandibular region have

similar psychological profiles and psychological dysfunction as other chronic musculoskeletal pain disorders, such as tension type headache and back or arthritic pain. (Suvinen and Hanes, 1997)(Dworkin, Massoth, 19941) There is considerable evidence that psychological and psychosocial factors are of importance in the understanding of TMD as with other chronic pain disorders, (McNeill, 1997) (Lupton , 1969) but there is less evidence that these factors are etiologic. Even though studies have indicated the role of stress in the etiology of TMD, the issue of whether psychological factors cause TMD or reflect the impact of TMD on the person remains unknown, due largely to the absence of longitudinal incidence studies designed to test the relationship of the onset of TMD pain to the onset of psychological and psychosocial factors. Today, the association between depression and stress and different physical symptoms of TMD is widely acknowledged. (Lupton, 1969) (Rudy , et al., 1989)TMD symptoms, especially pain, are also discussed as being a causative or intensifying factor in the development of depression and psychic diseases this time (Dworkin and LeResche, 1992). one cannot answer whether psychological disturbance is a source or consequence of chronic pain. The relationships between psychological aspects and parafunctions have been emphasized in many studies (McNeill, 1997) (Molina OF and dos Santos, 2002) (Dworkin, 1996). Primarily, psychological factors affect TMD symptoms more indirectly than directly. The overall level of anxiety and/or depression could modify the clenching and grinding habits (Velly, et al.,2003).

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Appendix